Effect of Peer Group Counselling on Infertility-Related Stress and Marital Satisfaction among Women Undergoing Intra-Cytoplasmic Sperm Injection

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ABSTRACT

Background: Infertility poses a significant challenge, especially for women whose psychological wellbeing is impacted by the issue. Women struggling with infertility often experience elevated stress levels and decreased marital satisfaction. Counseling and other therapeutic interventions are highly recommended to provide support for these women. **Aim:** To assess the effect of peer group counselling on infertility-related stress and marital satisfaction among women undergoing intra cytoplasmic sperm injection**. Subjects and method: Design:** A randomized controlled trial (repeated measures design) .**Setting:** The researchers conducted the study at Elbasma infertility center, Elbasma hospital, Menofia governorate, Egypt. **Subjects:** A simple random sampling included 88 infertile women divided equally into two groups, with each group consisting of 44 infertile women. **Tools:** the researchers used three tools, a structured interviewing questionnaire, Newton Infertility Stress Questionnaire (NIS), and Index of marital satisfaction (IMS) scale. **Results:** The inferential tests showed a significant difference in mean scores of infertility-related stress between both groups after the counseling intervention ($P<0.001$). Additionally, there were highly significant differences in the mean satisfaction scores of the counseling group across the four study periods ($P\leq0.001$) in contrast to insignificant changes in the control group's mean satisfaction score at the four measurements ($P=0.064$). **Conclusion:** Peer group counseling was found to be effective in reducing stress related to infertility and improving marital satisfaction in infertile women, as evidenced by post-intervention tests compared to baseline assessment. **Recommendations:** Peer group counseling should be integrated into the entire process of diagnosing and treating infertility in women.

Keywords: Peer Group Counseling, Infertility Related Stress, Infertility, Intra-Cytoplasmic Sperm Injection, & Marital Satisfaction.

INTRODUCTION

The World Health Organization (WHO) has identified infertility as a global public health issue that affects millions of people of reproductive age. Infertility is a disorder of the male or female reproductive system characterized by inability to conceive after at least 12 months of frequent unprotected intercourse (WHO, 2023). Infertility in women under 35 is defined as the inability to conceive after one year of unprotected intercourse (Akalewold, Yohannes, Abdo, Hailu, & Negesse, 2022). In women aged 35 to 40, it is described as the inability to conceive after six months of unprotected intercourse, and female fertility decreases with age (CDC, 2022).

Globally, the prevalence of infertility varies widely, ranging from 3% to 30% due to differences in how it is defined and demographic factors (Wang et al., 2022). The overall burden of infertility is significant, likely underestimated, and increased over the past 20 years. Fertility rates are declining worldwide, and according to the Central Agency for Public Mobilisation and Statistics (CAPMAS), Egypt's fertility rate dropped by 20% as it decreased from 3.5 births per woman in 2014 to 2.85 in 2021 (CAPMAS, 2022).

Intra Cytoplasmic Sperm Injection (ICSI) is a widely used treatment for infertility and has become a standard procedure in assisted reproduction units. It is often used in challenging infertility cases (Smith et al., 2021). This procedure involves retrieving a woman's egg based on specific criteria and injecting it with a live sperm in a laboratory, resulting in the creation of an embryo (fertilized egg). ICSI is a form of IVF, but with traditional IVF, thousands of sperm are placed next to an egg in a laboratory dish to allow for natural fertilization. In contrast, ICSI involves the direct injection of a single sperm into a single egg, which increase the success rate of fertilization. After fertilization, the embryo is inserted into the woman's uterus using ultrasound technology and a catheter, allowing for the embryo to attach to the lining of the uterus and for pregnancy to occur (Altal et al., 2020).

During fertilization treatment procedures, women encounter numerous challenges including multiple investigations, strict medication schedules, repeated examinations, clinic appointments, and complex decision-making. These factors

contribute to increased stress, fear, uncertainty, feelings of guilt, emptiness, and decreased marital satisfaction (Sharma, & Shrivastava, 2022).

Infertility-related stress is a group of symptoms that arise after receiving an infertility diagnosis, resembling those of post-traumatic stress disorder. The various treatments for infertility, particularly assisted reproductive technology (ART), can be highly stressful for women struggling with infertility and can place a significant mental and physical burden on both women and their partners (Maroufizadeh, Hosseini, Rahimi Foroushani, Omani-Samani, & Amini, 2019). Prolonged exposure to high levels of stress can result in depression and anxiety, which are known to have a negative impact on ICSI treatment outcomes. Additionally, it may also lead to marital dissatisfaction (Rahimi et al., 2021).

Marital satisfaction is a multidimensional concept that includes different elements of a marital relationship, such as adaptation, happiness, trust, and dedication (Sayehmiri et al., 2020). It also considers how well partners' sexual expectations are met, which can have a negative impact on the couple's physical and mental health. Infertility and related treatment techniques can have a substantial influence on a couple's lives, including marital happiness, and are critical to family life and general well-being (Li, Ye, Tian, Huo, & Zhou, 2020).

Infertility counseling is a highly recommended form of psychosocial support for couples struggling with infertility. It helps them manage the stress and emotional challenges associated with infertility, as well as address feelings of anger, misunderstanding, and relationship dissatisfaction (Koochaksaraei et al., 2023). Peer group infertility counseling is now widely recognized as an essential component of professional infertility counseling. Research has shown that it is just as effective as counseling provided by professionals. Peer counseling involves individuals from similar backgrounds who are not professionals but offer support by listening, clarifying, providing feedback, summarizing, asking questions, and offering positive and reassuring. They also help with planning, organizing, and problem-solving (Topping, 2022).

This counseling process is designed to help infertile women effectively manage perceived stress and emotional changes during the ICSI process (Hamzehgardeshi et al., 2019). Additionally, it has been found to improve sexual activity,

marital satisfaction, hope, and relationship skills (Abd El Hameed, & Thabet, 2021). As a result, this study aimed to investigate the impact of peer group counseling on infertility-related stress and marital satisfaction in women undergoing intra-cytoplasmic sperm injection.

Significance of the study

Infertility is a significant crisis that can lead to psychological stress and emotional strain, ultimately reducing marital satisfaction. According to the WHO in 2022, nearly one in six people have experienced infertility at some point in their lives (WHO, 2022). The number of couples seeking infertility treatment has increased in recent years due to the development of new assisted reproductive technology (ART) techniques such as ICS injection. However, these ART treatment can also lead to increased stress, anxiety, and interpersonal conflicts (Zahra, Soheila, Tahereh, Marzieh, & Atefeh, 2019). Negative consequences can result in higher rates of treatment discontinuation, lower success rates, and decreased overall pregnancy rates.

Therefore, it is crucial for women to be psychologically prepared before starting the treatment cycle, have adequate knowledge about the ICSI process, and clear up any misconceptions about it. Peer group counseling provides therapeutic support for the negative effects of infertility treatment procedures in a mature manner (Alkhutaba, & Alkhateeb, 2023). Thus, the current study aims to evaluate the effect of peer group counselling on infertility-related stress and marital satisfaction among women undergoing intra-cytoplasmic sperm injection.

In March 2020, President Abdel Fattah El-Sisi launched an initiative to "care for maternal and fetal health" for early detection of diseases transmitted from the mother to the fetus, and to provide free treatment and health care under the slogan "100 Million Health."

Operational definitions

Marital satisfaction: is one of the indications of marital quality; it is a true feeling of pleasure, contentment, and joy shared by a husband and wife when they evaluate all elements of their marriage. It genuinely signifies couples' interest in and sympathy for one another, as well as their positive attitude to being married. Several

factors influence it, including couples' sexual performance and contentment with sexual relationships, as well as their economic condition (Taghani, Ashrafizaveh, Ghanbari Soodkhori, Azmoude, & Tatari, 2019).

Effect size: is a statistical concept that quantifying the value of the size or the magnitude of the difference between two groups in relation to the effect of an intervention or the strength of a relationship between two variables. It is used to standardize the measurement of the magnitude of the effect independently of the sample size. It was calculated from multiple statistical tests and in some cases, subtracting and/or multiplying these from one another and/or percentage values **(**Barros, Ferrari-Piloni, Torres, Estrela, & Valladares-Neto, 2018).

AIM OF THE STUDY

Assess the effect of peer group counselling on infertility-related stress and marital satisfaction among women undergoing intra-cytoplasmic sperm injection.

Study hypotheses

To achieve the current study's aim, two hypotheses were tested:

- Women who receive peer group infertility counseling achieve lower perceived stress than in the control group.
- Women who receive peer group infertility counseling have higher marital satisfaction than in the control group.
- There is a significant statistical relationship between the counselling group's perceived stress score and their marital satisfaction score.

SUBJECTS AND METHOD

A.Technical design

Study design

A Randomized Controlled interventional Trial (RCT), repeated measures design was utilized. RCT is the gold standard to evaluate the effectiveness of a new intervention, treatment or a specific procedure (Hariton, & Locascio, 2018). The current study used it

to evaluate the effect of the independent variables (peer group infertility counseling) on the outcome variables (perceived stress and marital satisfaction). The current study followed the CONSORT statements rules (Eldridge et al., 2016).

Study setting

This study was conducted at Elbasma infertility center, Elbasma hospital, Menofia governorate, Egypt. The center was purposively selected because it is one of the most specialized centers which provide infertility treatment in the governorate. The center was part of Elbasma hospital, in the third floor, and involve four parts; registration and history taking part; diagnosis and examination part; preoperative and postoperative care part; and treatment options part.

Subjects and Sampling

A simple random technique was employed to allocate women to either the counselling or control group. Women were considered eligible if they met the following inclusion criteria: (1) aged from 20 to 41 years, (2) literate, (3) eligible to undergo ICSI procedure and (4) willing to participate in the study; while women who were excluded: women who were undergoing other infertility treatment methods, had a history of severe trauma or psychological events, experienced previous ICSI failure, and withdraw from the intervention for any reason.

Sample size calculation

Based on the study data from Soleimani et al., (2023) and by using Power Analysis software found on Statistics Kingdom website (OpenSource Statistics for Public Health), considering the level of significance of 5%, a medium effect size, effect type (F), two groups (one study and one control group), allocation ratio of 1:1, and a to account for 20% sample attrition, 8 women were added to each group, resulting in a total sample size of 88 women receiving Intra Cytoplasmic Sperm Injections.

Allocation technique to the groups

The total women sample was randomly assigned to two groups with allocation ratio 1:1 (each group contains 44 women undergoing ICSI) using a simple random technique by using the random number generation function in commercially available

mobile software (random picker, random number generator Pro). The counselling group took number one (having received the peer group counselling), and the control group took number two (having not received the peer group counselling). A CONSORT diagram show the flow of women through each stage of a randomized trial as shown in **Figure 1**.

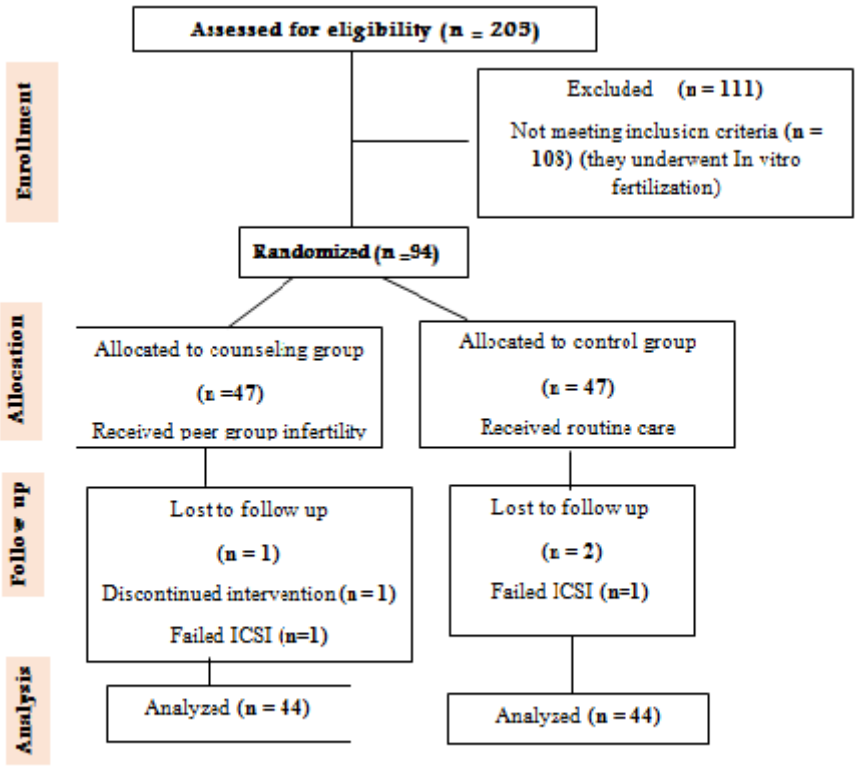

Figure 1: CONSORT flow diagram of the study participants

Tools of data collection

The researchers used three tools to collect the study data: a structured interview questionnaire, Newton Infertility Stress Questionnaire, and Index of Marital Satisfaction (IMS) scale.

Tool I- A structured interview questionnaire. The researchers constructed the tool after revising the related literature (Hamzehgardeshi et al., 2019) and which divided into two parts. The first part involved the women's demographic data such as age, education, occupation, residence, and mobile number. The second part was related the gynecological history as duration of marriage, previous pregnancy history, duration of being infertile, and duration of the infertility treatment.

Tool II- Newton Infertility Stress Questionnaire (NIS). Newton created this tool in (1999) to assess stress related to infertility. It is a valid and reliable self-report questionnaire. It consists of 46 items divided into five categories: social issues (10), sexual concerns (8), communication concerns (10), rejection of life without children (8), and the urge to become a parent (10). A scoring system: The women rated questionnaire items using a six-point Likert scale. The overall NIS score ranges between 46 and 276. The higher NIS scores indicates more stress level.

Fertility Problem Inventory: individual scales.

Scale	Definition
Social concern	Sensitivity to comments, reminders of infertility, feelings of social isolation, alienation from family or peers.
Sexual concern	Diminished sexual enjoyment or sexual self-esteem, scheduled sexual relations difficult.
Relationship concern	Difficulty talking about infertility, understanding/accepting sex differences, concerns about impact on relationship.
Need for parenthood	Close identification with role of parent, parenthood perceived as primary or essential goal in life.
Rejection of childfree lifestyle	Negative view of childfree lifestyle or status quo, future satisfaction or happiness dependent on having a child (or another child).
Global stress	Total score measuring overall infertility-related stress.

Tool III- Index of marital satisfaction (IMS). Hudson (1997) created this scale to assess the degree, severity, or extent of a spouse or partner's difficulty in a partnership relationship. The IMS does not assess or characterize the dyadic relationship as a whole, but rather the degree of marital disagreement or unhappiness experienced or perceived by the spouses. The IMS should not be used as a marital adjustment measure. A couple may have made appropriate arrangements for living and working together, indicating a positive marital adjustment.It had 25 items, such as, "My partner treats me badly, I feel that I would not choose the same partner if I had it to do over again," "I feel that our relationship is breaking up," "Our life together is dull," "My partner does not confide in me," "I feel that I cannot rely on my partner," "I feel that I should never have married my partner," and "Our relationship is very stable." These things used to quantify level of dissatisfaction with their marital relationship. A scoring system: The women rated scale items on a 7-point Likert scale The overall IMS score ranges between 25 and 175. According to Torkan and Moulavi, (2009), a higher IMS score indicates more dissatisfaction in the marital relationship as score of 70 or larger indicates serious problems in the relationship.

A.Operational design

Validity of the study tools

A panel of five experts in the fields of woman's health & midwifery and community health nursing tested the content validity of the study tools regarding its content, language, and structure to compute the content validity index (CVI), it was 0.85 and 0.89 respectively, which indicates that the study tools are highly relevant and valid tools.

Reliability of the study tools

Reliability for internal consistency of the NIS and IMS was statistically computed using Cronbach's α coefficient, it was 0.91 and 0.95 respectively, which indicates excellent reliable tools.

Pilot study

Researchers implemented a pilot study on 10% of the total sample size of women (9) who were excluded from the study to test the study tools' feasibility, relevance, applicability and time needed to fill in before implementing the intervention on the total sample size. According to their opinions, the study tools were clear, understandable and feasible, and no one of the women suggested any modifications or changes.

Ethical considerations

The researchers obtained Ethical approval from the research ethics committee, Faculty of Nursing, Menoufia University to perform the current study {code number NUR (16, 2 2022) (825)}. In addition, each woman signed informed written consent for voluntary participation after the researcher explained the study's aim and methodology to every woman clearly. Furthermore, the researchers told women that they had the right to withdraw from the study at any time without giving any reasons. The collected women's data is considered confidential, and assured throughout the whole study and reached only by the research team only.

Field work

The researchers conducted this study between February 2022 and July 2022, divided into three phases: initial assessment, implementation, and evaluation.

Baseline assessment phase

- At the initial survey of the ICSI procedure (the second and third day of the menstrual cycle), the researcher identified the recruited women with the assistance of the Elbasma nursing staff. The researchers introduced themselves, interviewed the recruited women to assure their eligibility in the study, and assessed women's general health by using the standard general health questionnaire (GHQ-28). As the researchers recruited women with a GH score 27 and below in the study.
- The researcher clarified the study's aim and procedure to the eligible women. The researchers obtained written informed consent from women who accepted to participate in this study.
- Before the group allocation, all women completed the study questionnaires (a structured interview questionnaire, NIS questionnaire, and IMS which assessed women's personal and gynecological history, perceived stress related to infertility, and level of marital satisfaction respectively) as baseline data.
- The researcher allocated eligible women to two groups either control group or counselling group by using mobile random generation software (https://play.google.com/store/apps/details?id=com.appsnblue.smartdraw&hl=en&gl=US&pli=1).
- The researchers developed the contents of the infertility counseling sessions, selected the teaching methods, and prepared the guidance Arabic booklet of the counselling sessions. The researchers confirmed the content validity of the guidance booklet by five experts who assured its clarity and comprehensiveness.
- The researchers chose four peer counselors from the previous setting, based on their age (30 to 41), higher education (university), strong verbal interaction, problem-solving abilities, and communication skills.

Implementation phase

This phase was completed through four counseling sessions. Additionally, a guidance booklet containing the content of the counseling sessions was distributed to peer counselors at beginning of the counselling sessions, while other study participants received it upon completion of the study, to be used as a reference guide. Each counseling session lasted from 90 to 120 minutes.

The first and second sessions were delivered to train peer counselors on the whole peer group counseling process for intra-cytoplasmic sperm injection. Meanwhile, during the third and fourth sessions, peer counselors led the counseling process with their peers regarding intra-cytoplasmic sperm injection.

First session (peer counselor training)

- The researchers met with the peer counselors at the Elbasma center meeting hall on the scheduled day of the women's visit. After the women completed their required investigations and physical examinations.
- In the beginning, the researcher greeted peer counselor and introduced them to each other. This session aimed to provide introductory information about the ICSI procedure as: ICSI definition, the purposes, objectives, typical issues, stages of the procedure. The researchers illustrated ICSI instructions before, during, and after the procedure. Moreover, the researcher presented the psychosocial care through asking the peer counselor to feel free for asking questions and expressing their feelings and concerns. At the end of this session. The researcher distributed guidance Arabic booklets to peer counselor be used as a guide. As well as the researcher gave the peer counselor her mobile number to keep in contact with them between the sessions and to confirm the time of the next sessions with their peers to be not conflicted with their daily schedules.

Second session (peer counselor training)

- The researchers met with the peer counselors at the beginning of the egg collection day. The session aimed to provide comprehensive information about egg collection and embryo transfer procedures.

- The researchers encouraged peer counselors to express their feelings and thoughts about these two procedures. Then, the researchers explained in details egg collection and embryo transfer procedures using assisted learning videos.
- The researchers discussed the quality of the marital relationship with the peer counselors that included their feelings of pleasure, satisfaction, and joyfulness experienced by them. They also discussed their attitude toward being married, which was affected by several factors such as their sexual performance, satisfaction with sexual relations, and economic situation, all of which contribute to strengthening their marital relationships.

Third session (peer group counselling)

- The researchers and peer counselors met with the women of the counseling group (peers group) at the Elbasma center meeting hall on the scheduled day of their visit, confirming the session time with them by phone call.
- The counseling session included three to four participants and one peer counselor who led the session under the guidance of the researcher.
- At the start of the session, peer counselors welcomed their peers and introduced themselves. The goal of this session was to provide an overview of the ICSI procedure, including its definition, purposes, objectives, common issues, and stages. The peer counselors, with the help of researchers, provided information about the instructions for ICSI before, during, and after the procedure.
- At the end of the session, the peer counselor and researchers provided their mobile numbers to stay in touch with the women between sessions and to confirm the timing of the next sessions.

Fourth session (peer group counselling)

- This session was implemented at the beginning of the egg collection day for eligible women.
  The counseling session involved three to four participants and one peer counselor who led the session under the guidance of the researcher.

- At the start, the peer counselors met with their peers group to provide comprehensive information regarding egg collection and embryo transfer procedures, with the assistance of the researchers.
- The peer counselors openly talked to their peers and encouraged them to express their fears, feelings, and thoughts about the ICSI procedure. The peer counselors then explained in detail the egg collection and embryo transfer procedures using assisted learning videos.
- The peer counselor discussed the quality of the marital relationships with their peers group, including the peers' feelings of pleasure, satisfaction, and joyfulness. They also discussed their attitudes toward being married, which were affected by several factors such as their sexual performance, satisfaction with sexual relations, and economic situation, all of which contribute to strengthening their marital relationships. At the end of the session, the peer counselor and researchers provided their mobile numbers to stay in touch with the women between sessions and to confirm the timing of the next sessions.

The control group at the Elbasma center received standard ICSI infertility care, including specific examinations, investigations, medical and nursing interventions, and medication regimens. This care also involved daily nursing care, scheduling of egg retrieval and embryo transfer, and regular follow-up. After completing the study, the control group received the guidance booklet containing all the information about the ICSI procedure that was delivered to the study group. This booklet was to be used as a reference guide.

Evaluation phase

The researcher remained in contact with participants through mobile calls to address any concerns and clarify any misunderstandings between sessions. The researchers used NIS and IMS to assess perceived infertility -related stress and marital satisfaction at the egg collection and the embryo transfer days after the counseling session. Additionally, the researchers reevaluated stress and martial satisfaction during a telephone interview on the day of the pregnancy test.

B.Administrative design

The researchers took official permission from the head of Elbasma infertility center. Before recruiting women, the researchers explained the study's aim and methodology to head of Elbasma infertility center and the assisted staff.

C.Statistical design

IBM SPSS version 20.0 (IBM Corp., Armonk, NY, USA) was used to analyze the data. Mean and standard deviation were used to describe normally distributed quantitative variables. The Kolmogorov -Simonov test was utilized to test for normality. Between-group comparisons utilized the independent t-test for normally distributed variables, and the chi-square test and/or Fisher exact tests for baseline qualitative characteristics. For repeated measure design, the RM-ANOVA test was used to test differences over time for normally distributed variables. The correlational test was utilized to test for linear correlation between NIS and IMS data. The internal consistency of the study tools was tested using Cronbach's alpha test, with a significance level set at 5%.

RESULTS

The baseline socio-demographic and gynecological history of the counselling and control groups are shown in **Table (1)**. The homogeneity-determining tests indicated insignificant differences between the counselling and control groups regarding all the studied socio-demographic and gynecological variables, including age, educational level, occupation, residence, cause of infertility, marriage duration, length of time one knows about their infertility, duration of the infertility treatment, and the previous pregnancy history (all, $p > 0.05$). The mean ages in the counselling and control groups were 32.38±4.32 and 30.29±6.01, respectively. More than half of both groups read and write. In both groups, less than half of the studied women had private work. As regards residence, nearly half of the women (52.3% and 45.5%) resided in urban areas. Concerning the gynecological history, the most common cause of infertility was the female cause (47.7% and 52.3%) in the counselling and control groups, respectively. The mean marriage duration in the counselling and control groups was 5.0 ±1.05 and 5.25 ±0.96, respectively. In relation to the mean duration of the infertility treatment, it was 3.86 ±1.09 and 3.99 ±1.05, respectively, in the counselling and control groups. Nearly half of the women in both groups were pregnant previously.

Study outcomes (Perceived stress related infertility)

Table (2) represents a comparison of domains of stress related infertility between both groups. There were insignificant differences regarding domains of social and sexual concerns before intervention. While after the intervention, there were significant differences in the social and sexual domains between both groups ($p<0.001$) at the four study times.

Table (3) shows a comparison of communication, rejection of life without children, and the need to become a parent domains between both groups. There were no significant differences regarding all previous mentioned domains before the intervention. While after the intervention, there were significant differences in the communication, rejection of life without children, and the need to become a parent between both groups ($p<0.001$) at the four measurements.

Table (4) shows the comparison of the stress-related infertility score changes between the control and counselling groups over four study times. At the baseline assessment, the independent t-test demonstrated similarity in the mean stress score between the two groups (P-value = 0.118). On the egg collection day after counselling implementation, there were statistically significant differences between the counselling and control groups, with a huge effect size ($t = 6.72$, $P \leq 0.001$, and $d = 1.43$). In the same line, there was a high mean difference between both groups at the embryo transfer day (29.98 with CI 36.22-23.75), this difference is statistically significant with a huge effect size ($t = 9.55$, $P \leq 0.001$, and $d = 2.03$). On the day of pregnancy checking, these stress mean scores decreased in the counselling group to 130.40± 11.77, while the mean stress score in the control group increased to 169.96± 14.91. This change is statistically significant with a high effect size ($t = 14.91$, $P \leq 0.001$, and $d = 2.94$).

Study outcomes (Index of marital satisfaction)

Table (5) reveals the comparison of the index of marital satisfaction changes between both groups over the study periods. At the pre-test assessment, there were homogenous baseline marital satisfaction scores, which indicated non-significant results ($P = 0.55$). At the egg collection and embryo transfer days after counselling implementation, the total counselling group satisfaction mean score improved to (51.72±5.67) and (54.65±5.26) respectively in contrast to the control group mean score,

which worsened to (62.47±1.98) and (63.13±3.87) respectively. These changes were significant, as indicated by the independent t test (P ≤0.001), with an elevated effect size (d = 2.53 and d =1.83). In the same line as the pregnancy test day results, there was a significant mean difference between both groups (11.88 **CI** 14.36–9.40), with a huge effect size (t=9.52, P ≤0.001, and d=2.03).

Table (6) demonstrated that there was a significant positive relationship between the counselling group's perceived stress score and their marital satisfaction score at the four measurements (P = 0.018, P = 0.038, and P = 0.023, respectively), except at the baseline assessment (P = 0.816). Compared to the control, there was an insignificant relationship between the women's perceived stress score and their marital satisfaction score at the four measurements (P = 0.186, P = 0.993, P = 0.589, and P = 0.614, respectively).

Table (1): Socio-demographic characteristics and gynecological history of the studied women (n=88).

Items	Total number of women =88				P- value Significance test
	Counselling group N=(44)		Control group N= (44)		
	No.	%	No.	%	
Age					
18-<28	14	31.8	17	38.6	0.278
28-<38	29	65.9	25	56.8	
-38 and more	1	2.3	2	4.5	
Mean (SD)	32.78(4.32)		30.29(6.01)		
Educational level					
Read and write	26	59.1	24	54.5	0.759
Secondary	14	31.8	18	40.9	
University	4	9.1	2	4.5	
Occupation					
Governmental work	24	54.5	17	38.6	0.90
Private work	18	40.9	19	43.2	
Housewife	2	4.5	8	18.2	
Residence					
Rural	21	47.7	24	54.5	0.522
Urban	23	52.3	20	45.5	
Cause of infertility *					
Male factor	9	20.5	9	20.5	0.967
Female factor	21	47.7	23	52.3	
Both	5	11.3	4	9.0	
Unknown	9	20.5	8	18.2	
Marriage duration					
Mean (SD)	5.0 (1.05)		5.25 (0.96)		0.250
Length of time one knows about their infertility					
Mean (SD)	4.07 (1.11)		4.19 (1.05)		0.597
Duration of the infertility treatment					
Mean (SD)	3.86 (1.09)		3.99 (1.05)		0.558
Previous pregnancy history					
No	24	54.5	20	45.5	0.394
Yes	20	45.5	24	54.5	

P-value for Chi-square test, Exact tests and/or Independent t test, **P** Significance * Significant ($p \leq 0.05$)

Table (2): Comparison of the mean scores of perceived stress domains at four times points before and after the intervention between the control and counseling groups (n=88).

Infertility Stress Questionnaire	Counselling group N=(44)		Control group N= (44)		Mean difference (95% CI)	Significance test between mean scores
	Mean	SD	Mean	SD		
Social concerns score=(60)						
Total baseline stress	18.75	5.27	17.54	2.56	1.20(0.55-2.96)	t=1.36 P=0.176
Post- intervention, egg collection	14.11	6.09	18.81	5.31	4.70(7.12-2.28)	t=3.85 P≤0.001
Post-intervention, day of embryo transfer	12.65	5.95	19.38	6.48	6.72(9.36-4.08)	t=5.06 P≤0.001
Post-intervention, pregnancy test day	11.11	5.75	20.48	6.45	9.37(11.96-6.78)	t=7.18 P≤0.001
Sexual concerns score=(48)						
Total baseline stress	17.63	1.67	17.0	1.49	0.63(0.035-1.30)	t=1.88 P=0.063
Post- intervention, egg collection	14.84	2.10	19.27	7.11	4.43(6.65-2.20)	t=3.96 P≤0.001
Post-intervention, day of embryo transfer	12.70	2.87	19.93	8.00	7.22(9.7-4.67)	t=5.63 P≤0.001
Post-intervention, pregnancy test day	12.11	3.05	20.86	8.28	8.74(11.39-6.10)	t=6.57 P≤0.001

t*: Independent t-test, d: Effect size of t tests (Cohen's d) d<0.2 small, d=0.5 medium, d>0.8 large, Significant (p≤ 0.05).

Table (3): Comparison of the mean scores of perceived stress domains at four times points before and after the intervention between the control and counseling groups (n=88).

Infertility Stress Questionnaire	Counselling group N=(44)		Control group N= (44)		Mean difference (95% CI)	Significance test between mean scores
	Mean	SD	Mean	SD		
Communication concerns score=(60)						
Total baseline stress	28.40	4.60	27.04	3.81	1.36(0.42-3.15)	t=1.51 P=0.134
Post- intervention, egg collection	24.68	5.49	27.84	3.40	3.15(5.09-1.22)	t=3.24 P≤0.001
Post-intervention, day of embryo transfer	22.72	5.82	28.59	4.24	5.86(8.02-3.70)	t=5.39 P≤0.001
Post-intervention, pregnancy test day	22.16	5.16	29.97	6.36	7.81(10.26-5.35)	t=6.32 P≤0.001
Rejection of life without children score=(48)						
Total baseline stress	41.68	3.61	41.59	3.48	0.09(1.41-1.59)	t=0.120 P=0.905
Post- intervention, egg collection	39.02	6.54	42.84	3.74	3.81(6.07-1.55)	t=3.35 P≤0.001
Post-intervention, day of embryo transfer	38.51	7.74	42.70	3.66	4.19(6.75-1.62)	t=3.24 P≤0.001
Post-intervention, pregnancy test day	37.10	7.65	43.22	3.91	6.12(8.70-3.54)	t=4.72 P≤0.001
The need to become a parent score=(60)						
Total baseline stress	51.63	7.05	52.02	6.20	0.38(3.20-2.42)	t=0.273 P=0.786
Post- intervention, egg collection	49.81	7.93	53.25	6.59	3.43(6.52-0.33)	t=2.20 P=0.03
Post-intervention, day of embryo transfer	48.27	8.55	54.27	5.25	5.97(8.98-2.96)	t=3.94 P≤0.001
Post-intervention, pregnancy test day	47.90	7.53	55.40	3.64	7.50(10.02-4.97)	t=5.90 P≤0.001

Table (4): Comparison of the mean perceived stress of infertility at four times points before and after the intervention between the control and counseling groups (n=88).

Infertility Stress Questionnaire	Counselling group N=(44)		Control group N= (44)		Mean difference (95% CI)	Significance test between mean scores	Effect size (Cohen's d)
	Mean	SD	Mean	SD			
Total baseline stress	158.11	9.57	155.20	7.58	2.90(0.75-6.56)	t=1.58 P=0.118	d=0.33
Post- intervention, egg collection	142.47	14.92	162.02	12.20	19.54(25.32-13.76)	t=6.72 P≤0.001	d=1.43
Post-intervention, day of embryo transfer	134.87	15.82	164.84	13.50	29.98(36.22-23.75)	t=9.55 P≤0.001	d=2.03
Post-intervention, pregnancy test day	130.40	11.77	169.96	14.91	39.55(45.25-33.86)	t=13.80 P≤0.001	d=2.94

t*: Independent t-test, d: Effect size of t tests (Cohen's d) d<0.2 small, d=0.5 medium, d>0.8 large, Significant (p≤ 0.05).

Table (5): Comparison of the mean marital satisfaction index score at four times points before and after the intervention between the control and counseling groups (n=88).

Marital satisfaction index	Counselling group N=(44)		Control group N= (44)		Mean difference (95% CI)	Significance test between mean scores	Effect size (Cohen's d)
	Mean	SD	Mean	SD			
Total baseline satisfaction	59.89	5.41	61.66	2.65	1.77(3.57-0.33)	t=1.95 P=0.056	0.40
Post-intervention, egg collection	51.72	5.67	62.47	1.98	10.75(12.55-8.94)	t=11.86 P≤0.001	2.53
Post-intervention, day of embryo transfer	54.65	5.26	63.13	3.87	8.47(10.43-6.51)	t=8.59 P≤0.001	1.83
Post-intervention, pregnancy test day	51.27	7.89	63.15	2.48	11.88(14.36-9.40)	t=9.52 P≤0.001	2.03

t*: Independent t-test, d: Effect size of t tests (Cohen's d) d<0.2 small, d=0.5 medium, d>0.8 large, Significant (p≤ 0.05).

Table (6): Correlation between NIS and IMS in the counselling and control group (n=88).

Items	Counselling group N=(44)		Control group N= (44)	
	r	***P***	***r***	***P***
Total baseline satisfaction	0.036	0.816	0.203	0.186
Post- intervention, egg collection	0.354	0.018	0.001	0.993
Post-intervention, day of embryo transfer	0.313	0.038	0.084	0.589
Post-intervention, pregnancy test day	0.342	0.023	0.078	0.614

**Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

The present study aimed to investigate the effect of peer group counselling on infertility-related stress and marital satisfaction among women undergoing intra-cytoplasmic sperm injection (ICSI). The study findings are highly significant and meet the research hypotheses that peer group infertility counselling lowered perceived stress and improved marital satisfaction in women undergoing ICSI.

This study aim agrees with the clinical trial of Ehsan, Yazdkhasti, Rahimzadeh, Ataee, and Esmaelzadeh-Saeieh (2019), who investigated the effectiveness of group counselling on stress and attitudes in infertile women and cited that group counselling can be used as an effective method for women's stress reduction. It also comes in agreement with Rahimi et al. (2021), who cited that the counselling intervention was effective in reducing stress and improving quality of life in infertile women. Furthermore, Alirezaei, Taghipour, and Latifnejad Roudsari (2022) determined the effectiveness of infertility counselling on the marital and sexual satisfaction of infertile couples and concluded that the counselling process improved the infertile women's marital and sexual satisfaction.

Similarly, a study by El-Feshawy, Zromba, and El-Ansary (2023) found that infertility counselling led to improved marital satisfaction in infertile females undergoing IVF. From the research points of view, these significant improvements were attributed to the non-judgmental approach of the counselling technique, which allowed women to freely express their feelings and ask any confusing questions in a confidential environment. Additionally, clear explanations of the entire ICSI process helped women better understand the treatment technique and reduced feelings of uncertainty and stress, ultimately leading to improved marital satisfaction.

In terms of socio-demographic and gynecological history, homogeneity tests showed non-significant differences in all tested characteristics between the counselling and control groups, indicating a similarity between the two groups. This similarity is essential for any randomized controlled trial to ensure that observed changes in outcomes between the groups are due to the intervention (peer group counseling) rather than confounding factors (Sterne, Hernán, McAleenan, Reeves, & Higgins, 2021). This finding is supported by several studies (Rahimi et al., 2021; Smith et al., 2021; Soleimani

et al., 2023), which also found insignificant differences regarding all tested descriptive characteristics between the study and control groups.

The results of Scio-demographic characteristics revealed that more than half of them aged 28 and 38, with a mean age above 30, slightly less than half of them had private work, lived in urban areas, and were literate. These characteristics are compatible with the subjects of many parallel studies. In this regard, Abdelhamied, Elbeltagy, Osman, Ahmed, and Saber (2023) revealed that nearly half of the women aged between 18 and 28 years had a mean age of 29.2±7.9; slightly more than half of them were employed and educated. In the same line, Ehsan et al. (2023) noted that the women's mean age was 29.2 ± 7.9; slightly more than half of them were working and were educated. From the researchers' perspective, the young age of the couples makes them highly aware of the importance of early diagnosis and treatment of infertility, which enhances the outcome of ICSI.

Concerning gynecological data, the current study demonstrated that the most common cause of infertility was the female cause in the intervention and control groups; the mean marriage duration was nearly five years. In relation to the mean duration of the infertility treatment, it was nearly four years. This result is compitable with randomized controlled trial by El-Feshawy et al. (2023)**,** who reported the female cause was among two-thirds of the studied participants, and nearly half of the participants had infertility for 4 to 6 years. Additionally, these findings are compatible with Abdelhamied et al. (2023), who reported that nearly two-thirds of their participants were diagnosed with infertility between 1 and 5 years, and the common cause of infertility was female factors.

As regards perceived stress-related infertility, there were significant differences between both groups after intervention at all study times ($P \leq 0.001$), as the study results demonstrated very highly statistical improvements in counselling group mean scores over four study times with a huge effect size of the peer counselling on the women stress score, compared with minimally significant differences in the control group. From the researchers' points of view, this study's findings may be due to the fact that peer group counselling essentially increases the adaptability, optimism, assertiveness, and confidence of infertile women in the treatment technique (ICSI). Furthermore, the counselling process improves women's ability to cope with stressful and challenging situations related to infertility.

In the same vein, an Iranian RCT was implemented by Rahimi et al. (2021) to test the effectiveness of group counselling on stress, anxiety, and depression in 60 infertile women and reported that women after the intervention practiced a lower degree of stress. This finding is also homogenous with the results of Kim et al. (2020) and Karaca et al. (2019)**,** who concluded that group counselling is an effective factor in stress management for infertile women.

Ehsan et al. (2019) found that group counselling was beneficial in reducing infertility stress in women in the aspects of social issues, sexual concerns, relationships, and childless life, which is consistent with the current study findings. Furthermore, this conclusion is similar with the Hamzehgardeshi et al. (2019) study, which investigated the impact of counselling programs on the perceived stress of women having assisted reproductive therapy. They determined that group counselling is one of the most effective approaches for reducing perceived stress in women undergoing ART.

Concerning marital satisfaction, there was a highly significant difference in the counselling group mean score over four study times, with an elevated effect size of peer counselling on the satisfaction score, compared with insignificant changes in the control group. From the researchers' perspective, the significant improvement in marital satisfaction may be attributed to a reduction in infertility-related stress. Additionally, evidence indicates that women can learn skills to enhance their marital and sexual relationships. Therefore, the observed improvement in the current study may be a result of the subjects' increased knowledge about infertility and its impact on marital relationships, as well as their acquisition of new communication skills.

This conclusion is reinforced by Alirezaei et al. (2022), who found that counselling and psychological therapies improve marital and sexual satisfaction in infertile couples, making them highly recommended for psychological management of infertile couples. In addition, the RCT of Poorheidari, Ganji, Hasani-Moghadam, Azizi, and Alijani (2021) evaluated the effects of relationship counselling on marital satisfaction among infertile couples and reported that the intervention was effective in improving marital satisfaction among the studied infertile couples.

The study of Hassan, Abd Elmordy, and Emam (2023) also agrees with the current study findings as it evaluated the effect of nursing counselling based on the

BETTER model on sexuality and marital satisfaction among infertile women and reported that the implementation of counselling utilizing the BETTER model was successful in improving infertile women's marital satisfaction. Furthermore, Dastaran et al. (2022) reported that the mean scores for sexual function, sexual self-efficacy, and marital satisfaction were higher among the study groups after intervention than before intervention.

The current study revealed that perceived related infertility was significantly and positively correlated with marital satisfaction in the counselling group post-intervention, compared to the insignificant correlation detected in the control group. This finding is consistent with Maroufizadeh et al., (2019), who cited that marital satisfaction in patients with infertility was influenced by not only their own perceived stress but also their partner's perceived stress. Thus, interventions that aim to reduce perceived stress and enhance marital satisfaction in the context of infertility should focus on the couple as a unit.

Furthermore, Tabassum, Sadia, Huda, and Khan (2023) conducted a study in Pakistan that examined infertility-related stress and marital satisfaction among Pakistani infertile couples and found a significant association between the two. According to the researchers, this considerable association can be due to the fact that that marital satisfaction is affected by women's psychological states, which are heavily influenced by infertility-related stress. As a result, by lowering women's stress, they may have higher marital satisfaction.

CONCLUSION

This study concluded that the finding supported the first hypotheses, women who receive peer group infertility counseling achieve lower perceived stress than in the control group and also they supported the second hypotheses, women who receive peer group infertility counseling have higher marital satisfaction than in the control group. As, the inferential tests showed that lowering perceived stress and marital dissatisfaction in the counselling group, compared to the control groups after the intervention implementation. Additionally, perceived infertility-related stress was significantly correlated with marital satisfaction in the counseling group during post-intervention tests.

RECOMMENDATIONS

Peer group counselling for women struggling with infertility should be incorporated throughout the entire process of diagnosis and treatment in order to alleviate stress and enhance marital satisfaction.

Further research is needed to

- Validate different counselling modalities for couples receiving different ART methods.
- Assess the effectiveness of educational packages for women undergoing ART on pregnancy outcomes.
- Assess the effectiveness of infertility counseling on the knowledge, coping strategies, and marital satisfaction of husbands of infertile women.

Conflicts of Interest

The researchers have no conflicts of interest to declare.

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تأثير استشارات مجموعة الأقران على التوتر المرتبط بتأخر الإنجاب والرضا الزواجي بين النساء الخاضعات لحقن الحيوانات المنوية داخل السيتوبلازم

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الخلاصة

غالبًا ما تعاني النساء اللاتي يعانين من تأخر الانجاب من مستويات مرتفعة من التوتر وانخفاض الرضا الزوجي. ويوصى بشدة بتقديم الاستشارة والتدخلات العلاجية الأخرى لتقديم الدعم لهؤلاء النساء. الهدف: تقييم تأثير استشارات مجموعة الأقران على التوتر المرتبط بتأخر الإنجاب والرضا الزواجي بين النساء الخاضعات لحقن الحيوانات المنوية داخل السيتوبلازم . التصميم: تجربة عشوائية ذات شواهد (تصميم التدابير المتكررة) الإعداد: أجرى الباحثون الدراسة في مركز البسمة للعقم، مستشفى البسمة، محافظة المنوفية، مصر. أخذ العينات: تم أخذ عينة عشوائية بسيطة شملت ٨٨ امرأة متأخرة بالإنجاب تم تقسيمهن بالتساوي إلى مجموعتين، حيث تتكون كل مجموعة من ٤٤ امرأة عقيمة. الأدوات: استخدم الباحثون ثلاث أدوات، استبيان المقابلة المنظم، واستبيان نيوتن لتوتر تأخر الانجاب (NIS) ، ومقياس مؤشر الرضا الزواجي (IMS) النتائج: أظهرت الاختبارات الاستدلالية وجود فرق كبير في متوسط درجات التوتر المرتبط بتأخر الانجاب بين المجموعتين بعد التدخل الاستشاري .(P<0.001)بالإضافة إلى ذلك، كانت هناك فروق ذات دلالة إحصائية في متوسط درجات رضا المجموعة الاستشارية عبر فترات الدراسة الأربع (P<0.001)على النقيض من التغيرات غير الهامة في متوسط درجة رضا المجموعة الضابطة في القياسات الأربعة .(P=0.064)الاستنتاج: وجد أن استشارات مجموعة الأقران فعالة في الحد من التوتر المرتبط بتأخر الانجاب وتحسين الرضا الزواجي لدى النساء اللائي تعاني من تأخر الانجاب ، كما يتضح من اختبارات ما بعد التدخل مقارنة بالتقييم الأساسي. التوصيات: ينبغي دمج استشارات مجموعة الأقران في العملية الكاملة لتشخيص وعلاج تأخر الانجاب عند النساء. يمكن أن يساعد هذا النهج في تقليل التوتر وتحسين الرضا الزوجي.

الكلمات المرشدة: استشارات مجموعة الأقران، التوتر المرتبط بتأخر الانجاب ، حقن الحيوانات المنوية داخل السيتوبلازم، والرضا الزوجي.